Kansas Water Office

KANSAS CLIMATE and DROUGHT UPDATE – January 2018 Summary

General

- U.S. Drought Monitor: Below normal precipitation during the past 30 days led to, an addition of severe drought (D2) and expansion of areas of moderate drought (D1) and severe drought (D2) during January. Abnormally dry (D0) conditions cover 100% of Kansas.

- Precipitation in January was below normal for the entire state, although some areas recorded significant precipitation.

- No severe weather was reported in January, but there were several winter weather advisories, several days with extreme fire danger, and also several days with wind chill warnings.

- La Nina advisory issued by forecasters for winter 2017/18. La Nina affects temperature and precipitation across the U.S., generally favoring above normal temperatures and below median precipitation across southern U.S, and below average temperatures and above median precipitation across the northern tier of the United States. Reduced snowfall is usual over parts of the central-southern Plains.

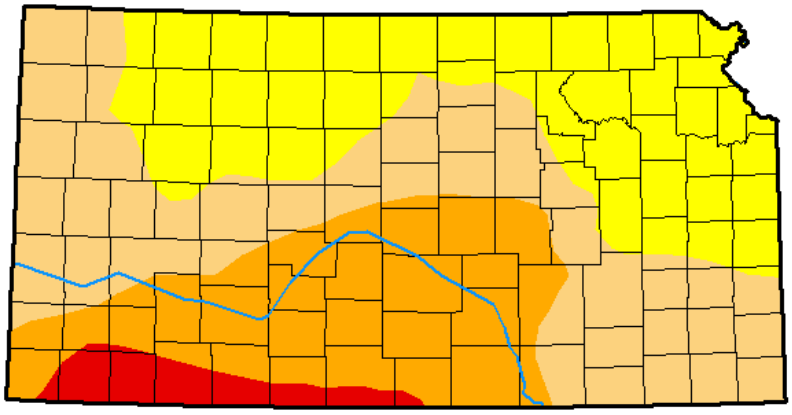
Lakes and Streams

- Water Rights above the USGS gage on the Little Arkansas River at Alta Vista have been administrated under Minimum Desirable Streamflow (MDS) since August 10, 2017.

General Conditions

With much below normal precipitation, there was a steep increase in the drought conditions during January. Extreme drought conditions cover over 4 percent of the state at the end of the month. Severe drought has expanded to over a quarter of the state while moderate drought covers an additional 36 percent of the state. No area of the state is currently drought-free. With the wet summer last year and current dryness, increased fire danger continues.

U.S. Drought Monitor
Kansas



January 30, 2018
(Released Thursday, Feb. 1, 2018)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	65.29	29.07	4.30	0.00
Last Week *01-23-2018*	0.00	100.00	52.91	19.19	4.08	0.00
3 Months Ago *10-31-2017*	85.96	14.04	0.64	0.00	0.00	0.00
Start of Calendar Year *01-02-2018*	0.00	100.00	32.70	8.75	0.00	0.00
Start of Water Year *09-26-2017*	59.89	40.11	10.08	1.35	0.00	0.00
One Year Ago *01-31-2017*	35.09	64.91	26.02	6.68	0.00	0.00

Intensity:

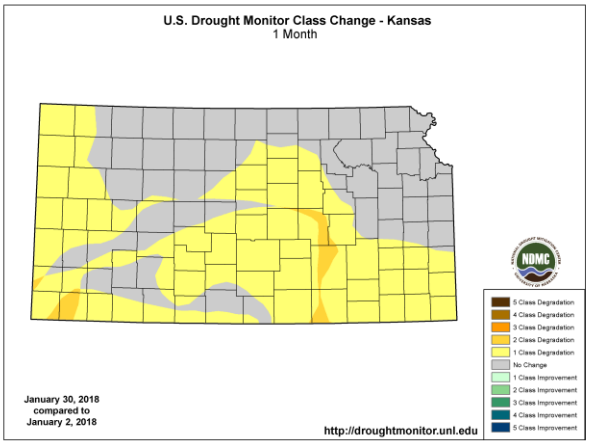
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Richard Heim
NCEI/NOAA

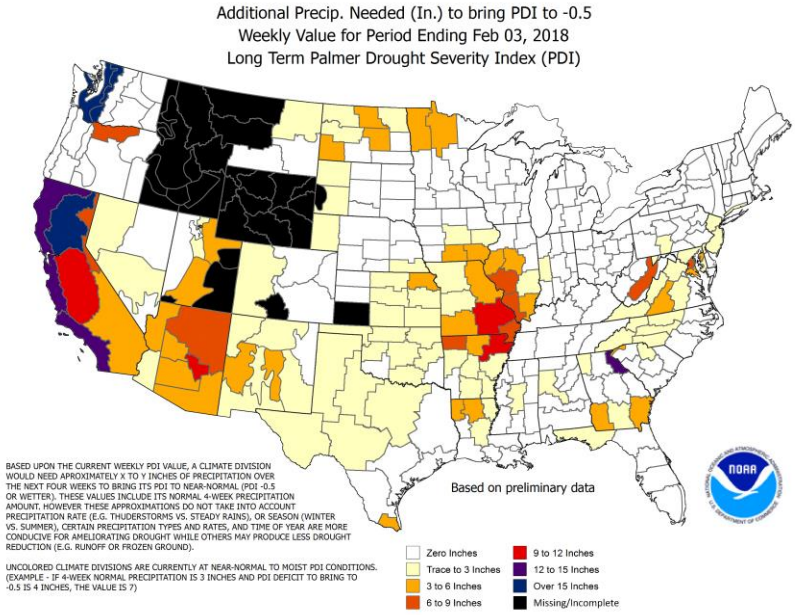
http://droughtmonitor.unl.edu/

More information on the U.S. Drought Monitor categories can be found at http://droughtmonitor.unl.edu/AboutUs/ClassificationScheme.aspx.



Palmer Drought Severity Index (PDSI) - The Palmer Drought Severity Index is an indicator of relative dryness or wetness and is one factor used the U.S. Drought Monitor. The additional precipitation map indicates the inches of precipitation needed to be out of drought.

More information on the PDSI can be found at http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml



Long-term PDI Precipitation needed to remove drought for weeks ending on date					
Climate Division	Jan 6	Jan 13	Jan 20	Jan 27	Feb 3
North Central	0.53	0.31	0.47	0.41	0.51
Northeast	3.12	2.86	3.04	3.12	3.16
Central	2.9	2.75	2.7	2.73	2.78
East Central	0.94	0.54	0.47	0.69	0.72
South Central	2.47	2.36	2.35	2.51	2.54
Southeast	0.44	-	0.3	0.85	1.18

Federal Disaster Declarations 2018

USDA Secretary makes agricultural disaster designations based on crop losses in a designated county. Disaster designations make emergency (EM) loans available to producers suffering losses in those counties and in counties that are contiguous to a designated county. In addition to EM loan eligibility, other emergency assistance programs, such as Farm Service Agency (FSA) disaster assistance programs, have historically used disaster designations as an eligibility trigger.

Designation may be through set process or using Fast Track Secretarial disaster designations for severe drought. Fast Track for drought provides for a nearly automatic designation when, during the growing season, any portion of a county meets the D2 (Severe Drought) drought intensity value for eight consecutive weeks or a higher drought intensity value for any length of time as reported in the U.S. Drought Monitor.

No USDA drought disasters have been declared in 2018 for Kansas.

Presidential Federal Disasters

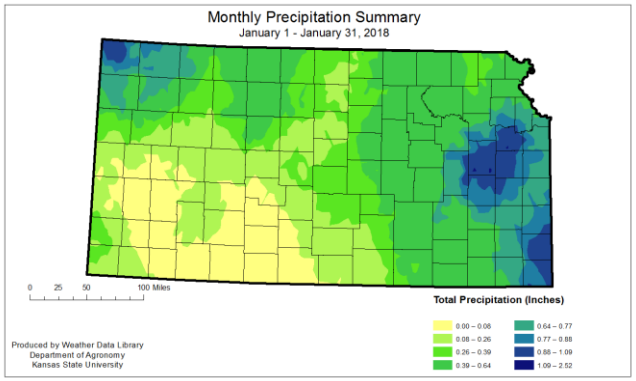
Presidential major disaster declarations must be requested of the President by a governor. A Presidential disaster declaration allows county governments to apply for Public Assistance funds for emergency work and the repair or replacement of disaster-damaged facilities. It also activates the Hazard Mitigation Grant Program statewide for actions taken to prevent or reduce long term risk to life and property from natural hazards.

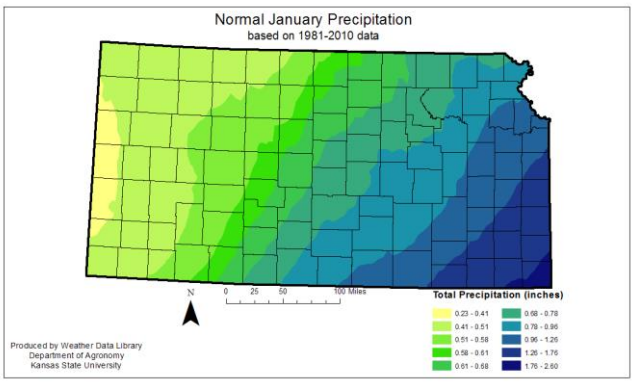
Climate Summary (Precipitation and Temperature)

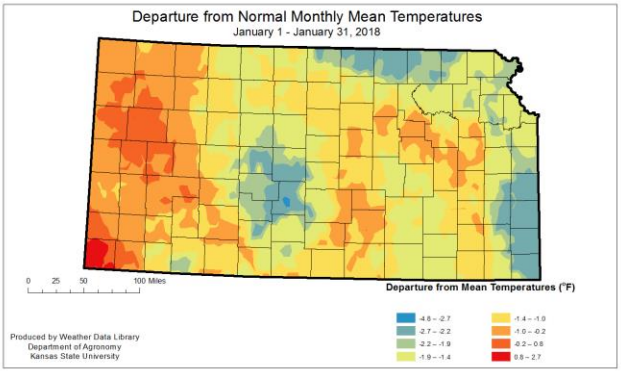
Parts of Kansas recorded some significant precipitation in January. At Tribune, a small snow event on January 12th snapped a 97-day period without any precipitation, tying the previous record set in 1901. When it comes to a wetting precipitation event – defined as a tenth of an inch or greater – Elkhart is just two days shy of the 120-day record set in 1936. Manhattan established a new record of 87 days, which ended on January 10th with 0.17 inches. The previous record was 76 days set in 1927. State-wide the average precipitation was 0.34 inches or 46 percent of normal. The East Central Division came closest to normal with 0.65 inches or 67 percent of normal. The South Central Division, with just 0.18 inches, had the lowest percent of normal with just 21 percent. The greatest monthly precipitation totals were 2.52 inches at Osage City, Osage County (NWS) and 2.05 inches at St. Francis 12.1 NW, Cheyenne County (CoCoRaHS). Most of the precipitation came in the form of snowfall. A series of storms brought snowfall across mainly the northern half of the state. Forty-six locations set daily records for snowfall. Multiple locations tied for the greatest daily snowfall at 9 inches at Atwood, Rawlins County, on the 22nd. The greatest snowfall totals for the month were 12 inches at Atwood, Rawlins County (NWS) and 14.4 inches at Goodland 16.6 NW, Sherman County (CoCoRaHS).

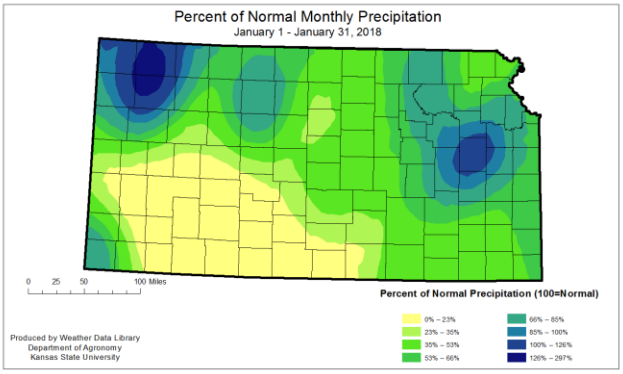
Precipitation summary for the month is provided in the table and maps below from the KSU Weather Library. In addition, weekly maps of precipitation and temperature information can be accessed at http://climate.k-state.edu/maps/weekly/.

Kansas Climate Division Precipitation Summary (inches)												
Climate Division	January 1-31, 2018			January 1-January 31, 2018			April 1, 2017-January 31, 2018			September 1, 2017-January 31, 2018		
	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
Northwest	0.28	-0.17	61	0.28	-0.17	61	17.62	-1.89	89	3.95	-0.97	77
West Central	0.22	-0.28	48	0.22	-0.28	48	19.49	0.72	104	4.84	-0.13	97
Southwest	0.19	-0.28	41	0.19	-0.28	41	19.36	1.37	108	3.85	-1.08	80
North Central	0.36	-0.27	60	0.36	-0.27	60	22.41	-2.78	89	5.57	-1.79	75
Central	0.29	-0.40	43	0.29	-0.40	43	21.32	-4.71	82	5.12	-2.39	70
South Central	0.18	-0.65	21	0.18	-0.65	21	24.81	-2.72	90	5.81	-2.87	66
Northeast	0.31	-0.50	40	0.31	-0.50	40	24.61	-6.99	77	5.02	-5.12	50
East Central	0.65	-0.29	67	0.65	-0.29	67	29.19	-4.75	84	6.22	-5.04	53
Southeast	0.58	-0.67	46	0.58	-0.67	46	36.40	-0.35	98	7.65	-5.69	57
STATE	0.34	-0.40	46	0.34	-0.40	46	24.09	-2.19	92	5.37	-2.75	69





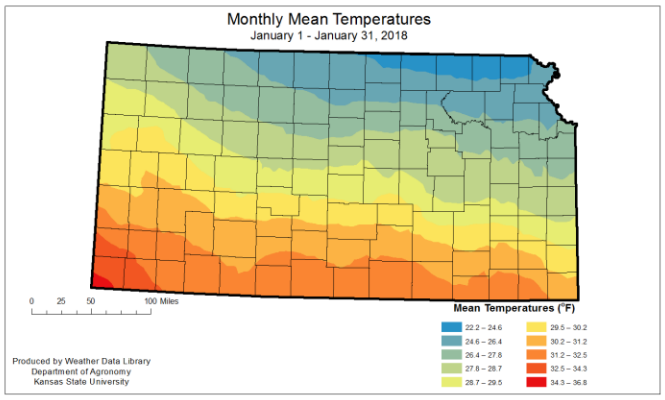


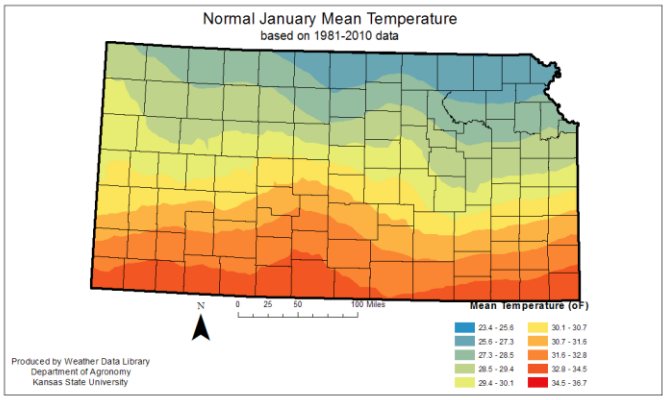


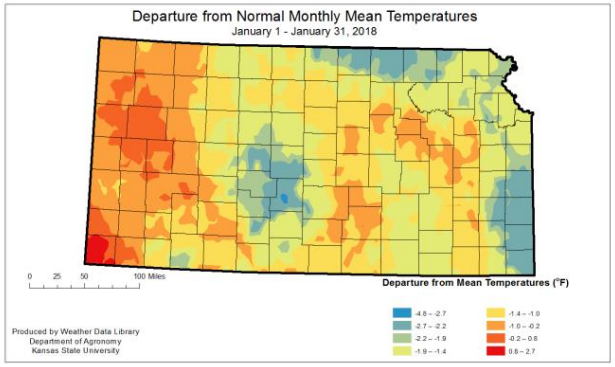
Precipitation maps are also available from the High Plains Regional Climate Center at various time intervals. http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps.

January continued the pattern of wide temperatures swings, as might be expected with the dry air in place. The statewide average temperature was 28.8 °F, or 1.1 degrees cooler than normal. The warm days weren't persistent enough to outweigh the very cold start to the month. The western divisions came closest to normal, with the Southwest Climate Division coming in as the warmest, averaging 32.7 °F, or 0.1 degrees warmer than normal. The central and eastern divisions were all colder than normal. The Northeast had the greatest departure, with an average of 25.0 °F or 2.5 degrees cooler than normal. The warmest temperature reported for the month was 83 °F at Medicine Lodge, Barber County, on the 20th. The coldest reading was -16 °F at Belleville, Republic County, on the 1st. Records were set on both the cold and warm end of the spectrum. On the cold side, there were 37 new record low maximum temperatures and 31 new record low minimum temperatures. On the warm side, there were 41 new record high maximum temperatures and 53 new record high minimums.

Climate Division	Kansas Climate Division Temperature Summary (°F)							
	January 2018							
	Maximum	Minimum	Average	Departure	High	Date	Low	Date
Northwest	43.3	13.1	28.2	-0.6	74	20	-9	1
West Central	47.1	12.8	30.0	0.2	77	11	-10	1
Southwest	50.8	14.5	32.7	0.6	80	20	-9	1
North Central	38.5	13.3	25.9	-2.0	69	11	-16	1
Central	41.8	15.4	28.6	-1.3	77	11	-10	1
South Central	45.2	16.8	31.0	-1.1	83	20	-8	1
Northeast	36.7	13.3	25.0	-2.5	66	26	-13	1
East Central	38.5	15.9	27.2	-1.9	68	25	-22	1
Southeast	42.1	18.3	30.2	-1.5	69	22	-7	2
STATE	42.7	14.8	28.8	-1.1	83	20th	-22	1st
Data Source: KSU Weather Library								







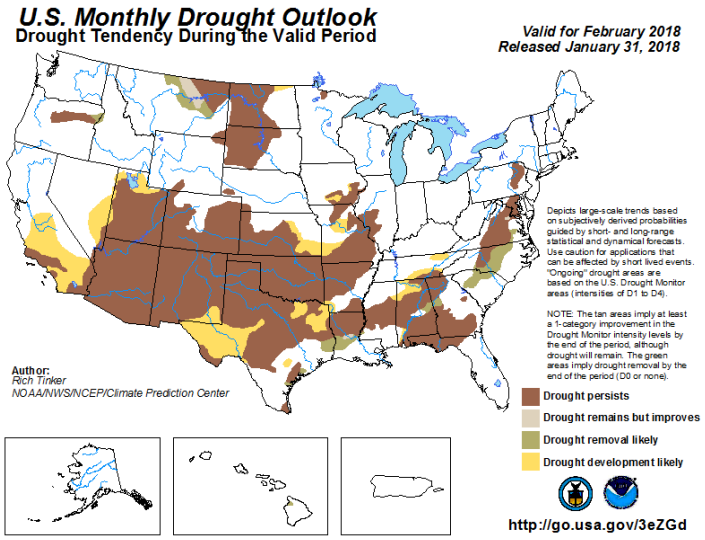
Temperature maps are also available from the High Plains Regional Climate Center at various time intervals. http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps

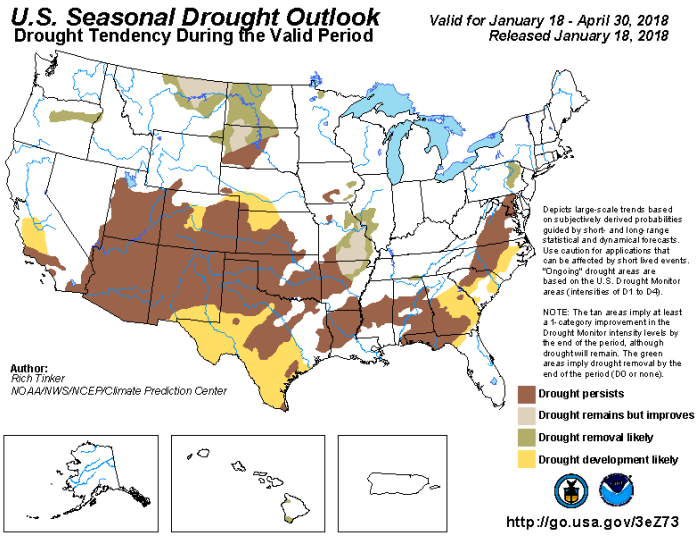
Future Outlook

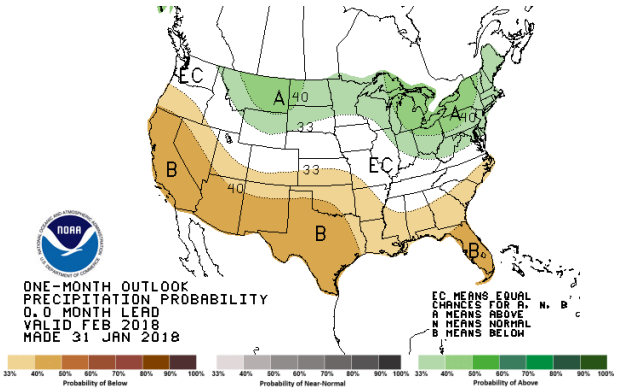
The Monthly Drought Outlook indicates drought conditions to remain in southern and western Kansas.
The February outlook has a slight chance for drier than normal conditions in the southern half the state, and equal chances for above or below normal precipitation in the rest of the state. Given the low amount of moisture that typically is seen in February, improvement in the current drought status is unlikely.

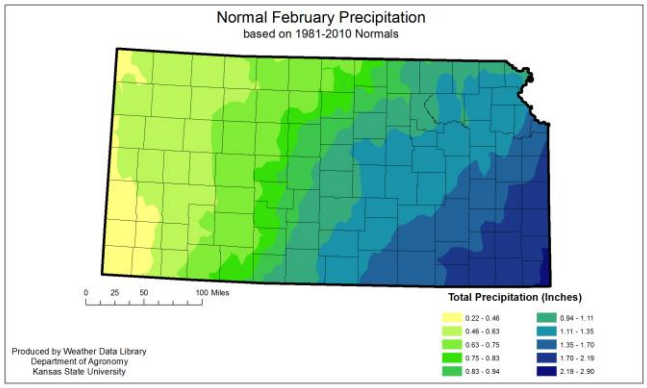
Seasonal Outlook also favors continued drought in south central, central and western Kansas with expansion of areas affected to include the north central Kansas. For the February-April time period probability favors below normal precipitation and above normal temperatures for western parts of the state. The remaining area have equal chances of below or above normal precipitation and temperatures for the period.

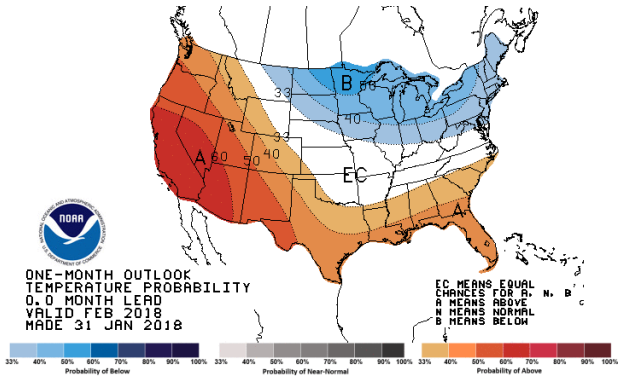
The individual temperature and precipitation outlooks are provided below for the one and three month periods.

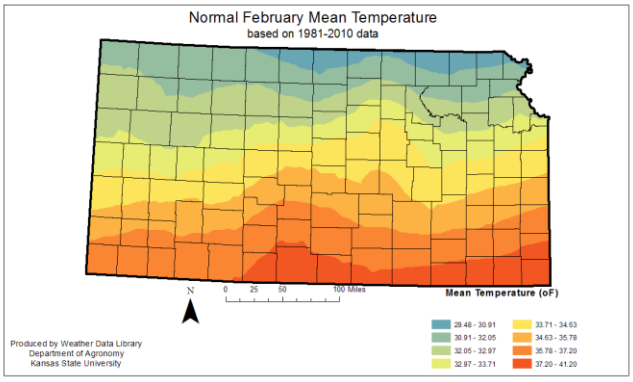


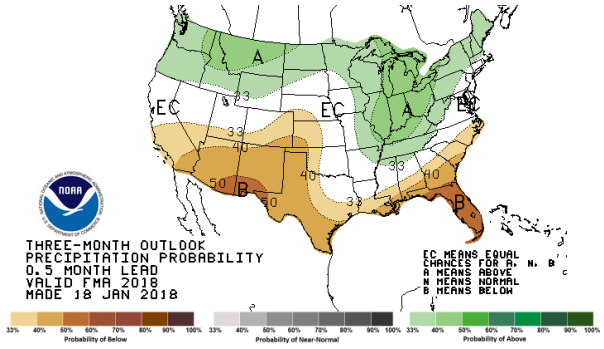


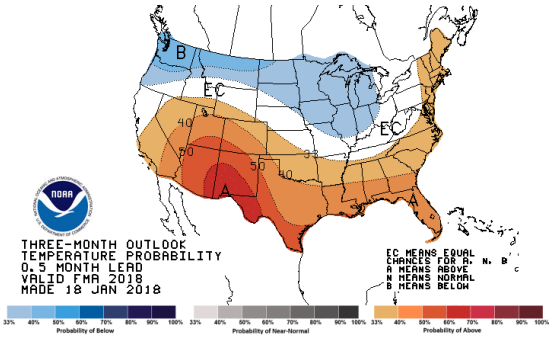












Additional outlooks for various timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed.

Known issues:

Stage II water restrictions, remain in place under Resolution 03-16 are in place for the **City of Russell,** Russell County water customers as of February 1, 2018 (www.russellcity.org/148/Current-Water-Status). The water restrictions include a prohibition on outdoor watering from 10:00 am to 7:00 pm. It also prohibits the waste of water.

Stage II water restrictions have been in place for the **City of Victoria**, Ellis County since June 2017. No lawn watering or filling of private swimming pools is allowed. Watering of trees, flowers and gardens allowed, but not between 10 am and 5 pm. (February 1, 2018, http://victoriaks.com/utilities.htm.)

Water Emergency currently in place for **Medicine Lodge**, Barber County. Citizens may water before 10 am and after 9 pm.(https://medicinelodge.kansas.gov/ February 1, 2018)

Surface Water Supply Conditions

Kansas River basin: Inflow to Tuttle Creek, Perry, Milford, and Clinton reservoirs remained below normal in January. Additional releases were made from Milford to reach the lower winter pool elevation target. These releases were beneficial with the extended freezing conditions over the month. Bypassing all inflows from Tuttle and the releases from Milford resulted in near median flows in the Kansas River.

Marais des Cygnes basin: Melvern, Pomona, and Hillsdale reservoirs received very little inflow in January. Melvern declined over the month from lack of inflow and minimum releases. Pomona and Hillsdale declined primarily from releases to lower lake level, according to the seasonal plan. Flow in the Marais des Cygnes River maintained near median values due to the releases from Pomona and Hillsdale reservoirs.

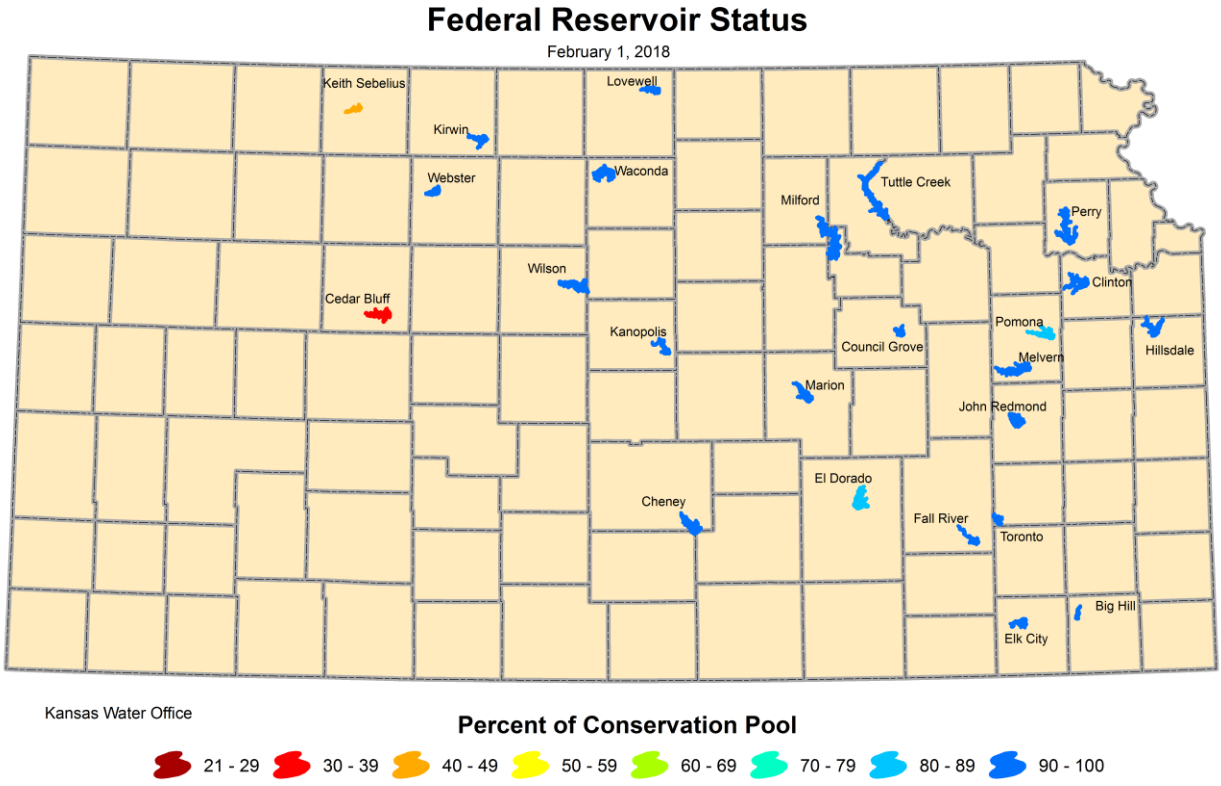
Cottonwood/Neosho basin: Inflows to Marion, Council Grove, and John Redmond reservoirs were generally low throughout the month and streamflow declined throughout the basin, especially the Upper Neosho. Conservation storage is full in John Redmond but steadily declined in Marion and Council Grove. Releases are necessary to maintain sufficient streamflow in the upper system.

Verdigris basin: Toronto, Fall River, Big Hill and Elk City reservoirs remained near conservation pool levels in January but reservoir releases were necessary to supplement low flow conditions of the Fall and Verdigris Rivers.

Saline basin: The elevation at Wilson Lake is being maintained slightly above normal pool.

Smoky Hill basin: The middle Smoky Hill basin maintained near median streamflow. Kanopolis Lake declined throughout December and into the first week of January due to releases necessary to accommodate a periodic inspection of the outlet works. After the inspection the discharge was reduced to 10 cfs and inflows were sufficient to refill conservation storage.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**01/31/2018**		
Norton[1]	2304.3	2291.84	-12.46	39.8
Harlan County, NE	1945.73	1938.72	-7.01	72.6
Lovewell[1]	1582.6	1581.3	-1.3	89.6
Milford[1]	1144.4	1143.34	-1.06	95.7
Cedar Bluff	2144	2117.68	-26.32	29.8
Kanopolis[1]	1463	1463.34	0.34	100
Wilson[1]	1516	1516.18	0.18	100
Webster[1]	1892.5	1893.66	1.16	100
Kirwin[1]	1729.3	1728.67	-0.63	97.1
Waconda[1]	1455.6	1454.59	-1.01	94.3
Tuttle Creek[1]	1075	1073.13	-1.87	92.3
Perry[1]	891.5	893.22	1.72	100

Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Clinton[1]	875.5	876.28	0.78	100
Melvern[1]	1036	1034.91	-1.09	95
Pomona[1]	974	972.33	-1.67	88.5
Hillsdale[1]	917	915.97	-1.03	93.7
Arkansas River Basin		**02/01/2018**		
Cheney	1421.6	1420.47	-1.01	94.0
El Dorado	1339	1335.55	-3.66	83.0
Toronto[1]	901.5	901.50	0.07	100.0
Fall River[1]	948.5	947.98	-0.20	97.0
Elk City[1]	796	796.36	0.20	100.0
Big Hill	858	857.64	-0.52	98.0
Council Grove[1]	1274	1272.45	-1.21	93.0
Marion[1]	1350.5	1348.70	0.20	100.0
John Redmond[1]	1039	1041.58	0.78	100.0
[1]Lake level management plan in place				Source: U.S. Army Corps of Engineers
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.				

Harmful Blue-Green Algal Blooms (lake water safety)

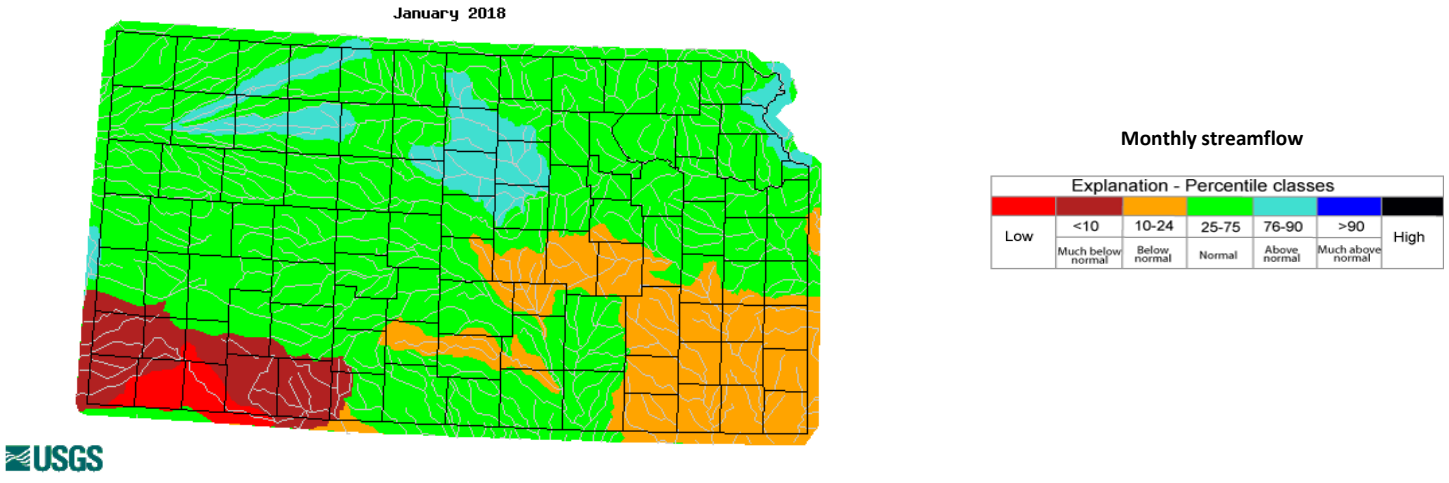
KDHE issues two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. Public Health Watch–Notifies public that a hazardous condition may exist, that the water may be unsafe for humans and animals and contact with the water is discouraged. Public Health Warning–Notifies public that conditions are unsafe, that contact with the water should not occur, and all conditions of Public Health Watch remain in effect. Warning that conditions are unsafe and water contact should not occur include that no swimming, wading, skiing or consumption of the water should occur. The following warnings and watches were in issued by KDHE and remain in effect until testing begins again in spring.

November 28, 2017: Public Health Watch for Central park Pond, Shawnee County and Hiawatha City Lake, Brown County.

Streamflow Conditions

WaterWatch summarizes streamflow conditions in a region (state or hydrologic unit) in terms of the long-term typical condition at stream gages in the region.

Monthly stream flow compared to historical is reflected in the map below.



In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.

Water Right Administration/Minimum Desirable Streamflow (MDS)
Minimum Desirable Streamflow (MDS) is not being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

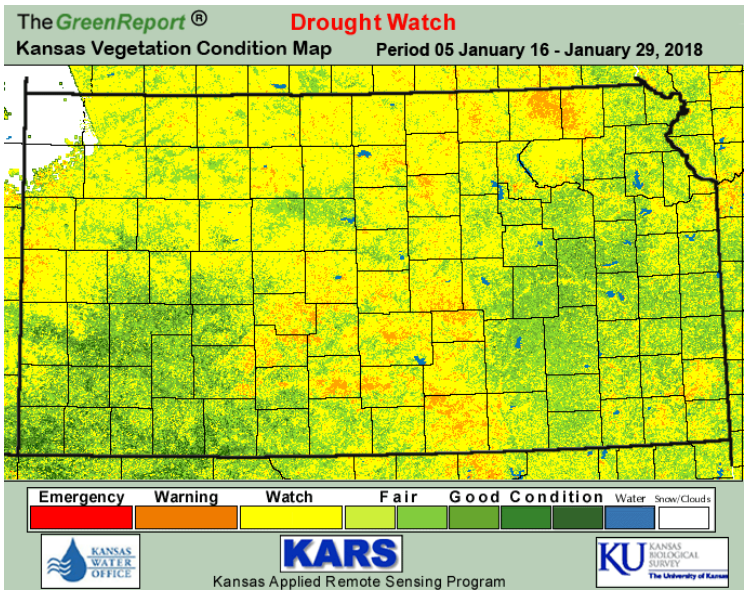
MDS administration occurred during the month, with administration beginning August 10, 2017 on the Little Arkansas River at Alta Mills. The table below provides a snapshot of conditions for streams of interest to the Kansas Department of Agriculture, Division of Water Resources.

There are locations where flows are below MDS, but administration is not in effect since there are no junior diversion above each gage.

Streamflows as of February 1, 2018				
Gaging Station	**Current Flow**	**Feb MDS**	**Jan MDS**	**Comment**
Republican River at Concordia	Ice	125	100	
Republican River at Clay Center	Ice	150	125	
Mill Creek near Paxico	9	8	8	
Delaware River near Muscotah	Ice	10	10	
Rattlesnake Creek near Macksville	0	5	5	No surface water diversions junior to MDS above gage
Rattlesnake Creek near Zenith	11	15	15	No surface water diversions junior to MDS above gage
Little Arkansas River at Alta Mills	5	8	8	MDS admin began Aug 10, 2017
South Fork Ninnescah River near Pratt	6	10	10	No surface water diversions junior to MDS above gage

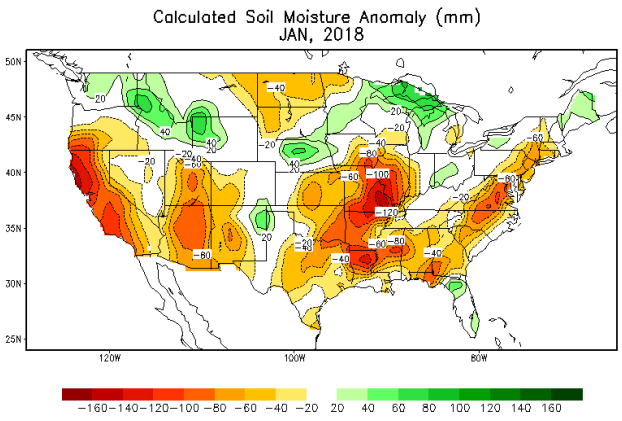
Soil, Crop and Vegetation

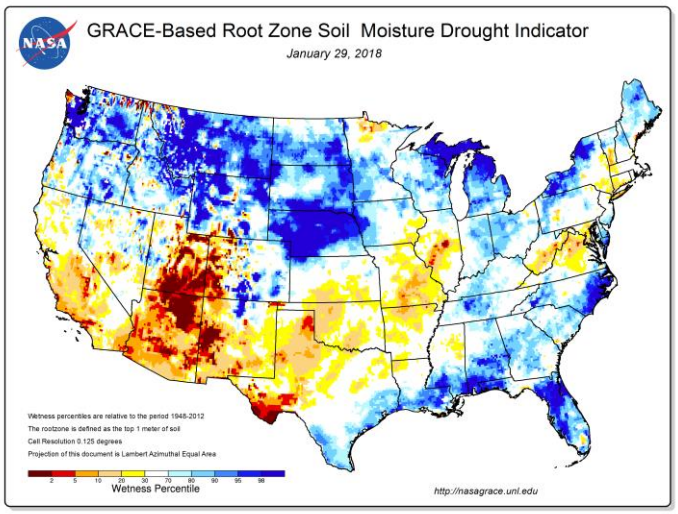
Kansas Vegetative Conditions
The Kansas Vegetative Condition map (on right) is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. Areas in the south-central are showing signs of dryness. Most of the northern areas are in the 'watch' category. East and southwest are in good condition due to mostly warmer temperatures, although nothing is really growing at this time.



Soil Moisture
The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology. The monthly soil anomaly is provided below.http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

NASA is generates soil moisture drought indicators each week using GRACE satellite data integrated with other observations. Indicators describe wet or dry conditions as a percentile of probability of occurrence within the period of record (1948-present).

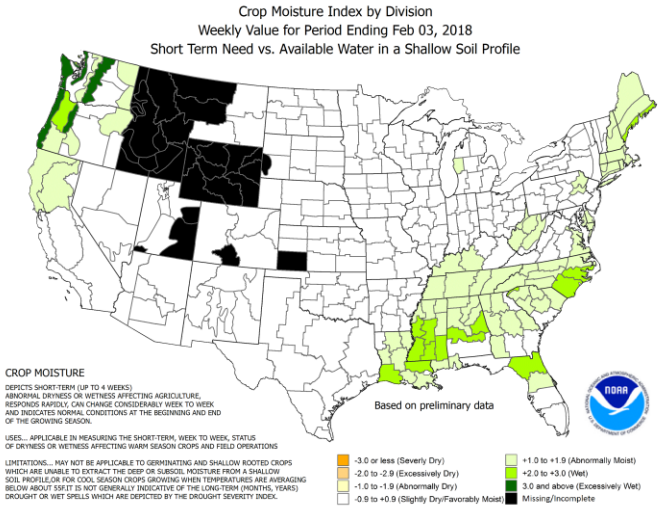




Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.

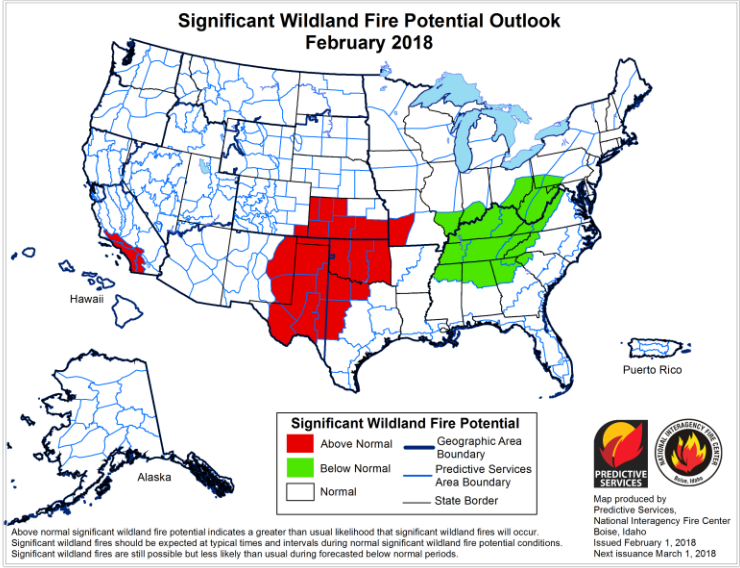
USDA Crop Progress and Condition provide some indication of the climatic effects on soil, and livestock feed and water supplies. The Kansas report for the state as a whole for the month of January topsoil moisture was 35% very short, 44% short, 19% adequate, and 2% surplus. Subsoil moisture was 22% very short, 48% short, 30% adequate, and 0% surplus. Winter wheat condition was 10% very poor, 34% poor, 42% fair, 13% good, and 1% excellent.

Based on the Palmer Drought Index, the Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.



Fire Outlooks

As dry conditions continue, there is an increased potential for wildfire.



Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report are compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. The KWO web site, KWO Drought, contains additional drought information including links to other agencies with drought information and past issues of the Kansas Climate Summary and Drought Report. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. In the Kansas county drought stage scheme, a Drought Watch equates roughly to moderate drought in the U.S. Drought Monitor, while a Drought Warning is the equivalent of severe drought. A Drought Emergency is reserved for extreme or exceptional drought. Palmer Drought Severity Index - The Palmer Index (PDSI) is one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments and reservoir release protection.

The water levels of the federal lakes fluctuate during a year according to the management plan. Lake level Management plans are posted on the Kansas Water Office web site www.kwo.org.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

The Seasonal Drought Outlook, developed by the NOAA Climate Prediction Center, assesses the likelihood for improvement, persistence or deterioration in drought conditions for areas currently experiencing drought as identified by the U.S. Drought Monitor. Also see: http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

Responding to Drought: A Guide for City, County and Water System Officials provides an overview of Kansas county drought stage declarations, local planning and coordination, disaster declarations and available state and federal assistance. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by KWO, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

January 2018 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	1.06	0.68	279%	31.9	2.5	74 (19)	-7 (6)
Dodge City	0.09	-0.49	16%	33.6	1.4	74 (10)	-9 (1)
Garden City	T	-0.34	0%	32.2	1.3	73 (10)	-9 (1)
Goodland	0.68	0.30	179%	31.6	2.0	74 (19)	-7 (6)
Guymon, OK	0.01	-0.39	3%	37.4	1.8	80 (30, 20)	-1 (16)
Hill City	0.38	-0.07	84%	30.1	0.8	70 (19)	-3 (16)
Lamar, CO	0.09	-0.21	30%	31.9	3.0	75 (20)	-9 (16)
McCook, NE	0.97	0.46	190%	26.7	-0.5	60 (9)	-6 (2)
Springfield, CO	0.14	-0.23	38%	33.9	1.7	79 (19)	-8 (16)
Central							
Concordia	0.42	-0.16	72%	28.6	0.0	66 (25)	-10 (1)
Hebron, NE				26.2	0.6	62 (25)	-15 (1)
Medicine Lodge	0.08	-0.63	11%	34.2	0.8	69 (25)	-4 (1)
Ponca City, OK	0.11	-0.89	11%	35.7	0.8	69 (21)	-1 (1)
Salina	0.34	-0.29	54%	31.6	0.5	69 (25)	-5 (1)
Wichita (ICT)	0.20	-0.63	24%	34.1	1.8	67 (25)	-2 (1)
East							
Bartlesville, OK	0.46	-1.16	28%	34.1	-0.9	71 (21)	-2 (17)
Chanute	0.61	-0.65	48%	33.2	0.6	67 (25,21)	-3 (1)
Fall City, NE	0.09	-0.56	14%	25.6	-0.9	63 (25)	-17 (1)
Johnson Co. Exec. Apt	0.70	-0.42	63%	28.6	-1.5	64 (21)	-9 (1)
Joplin, MO	0.47	-1.56	23%	33.1	-1.8	72 (21)	-6 (16)
Kansas City (MCI), MO	1.13	0.06	106%	28.4	-0.4	64 (25,21)	-11 (1)
St. Joseph, MO	0.77	0.21	138%	28.6	1.4	62 (25)	-14 (1)
Topeka (TOP	0.94	0.08	109%	29.4	-0.3	68 (25)	-9 (1)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 normal value
T - Trace; M - Missing; --- no normal value from which to calculate departure or percent of normal
Source: National Weather Service F-6 Climate Summaries